

# Today Objectives

- Introduction to Java Programming
- Hello world
- Simple syntax

# What is programming?

- **program:** A set of instructions to be carried out by a computer.
- **program execution:** The act of carrying out the instructions contained in a program.
- **programming language:** A systematic set of rules used to describe computations in a format that is editable by humans.
  - This textbook teaches programming in a language named Java.



# **Basic Java programs with `println` statements**

# Compile/run a program

## 1. Write it.

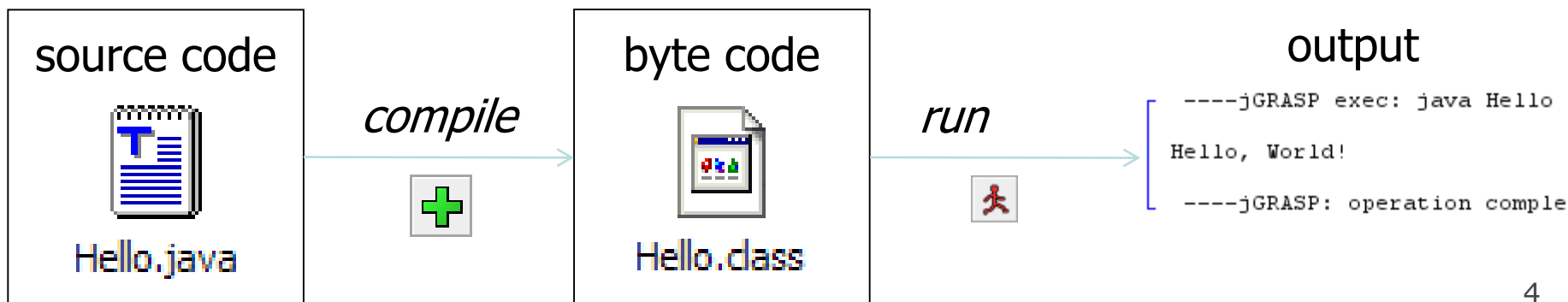
- **code** or **source code**: The set of instructions in a program.

## 2. Compile it.

- **compile**: Translate a program from one language to another.
- **byte code**: The Java compiler converts your code into a format named *byte code* that runs on many computer types.

## 3. Run (execute) it.

- **output**: The messages printed to the user by a program.



# A Java program

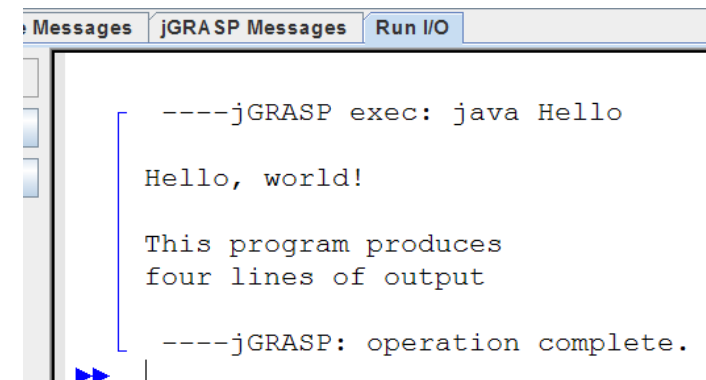
```
public class Hello {  
    public static void main(String[] args) {  
        System.out.println("Hello, world!");  
        System.out.println();  
        System.out.println("This program produces");  
        System.out.println("four lines of output");  
    }  
}
```

- **Its output:**

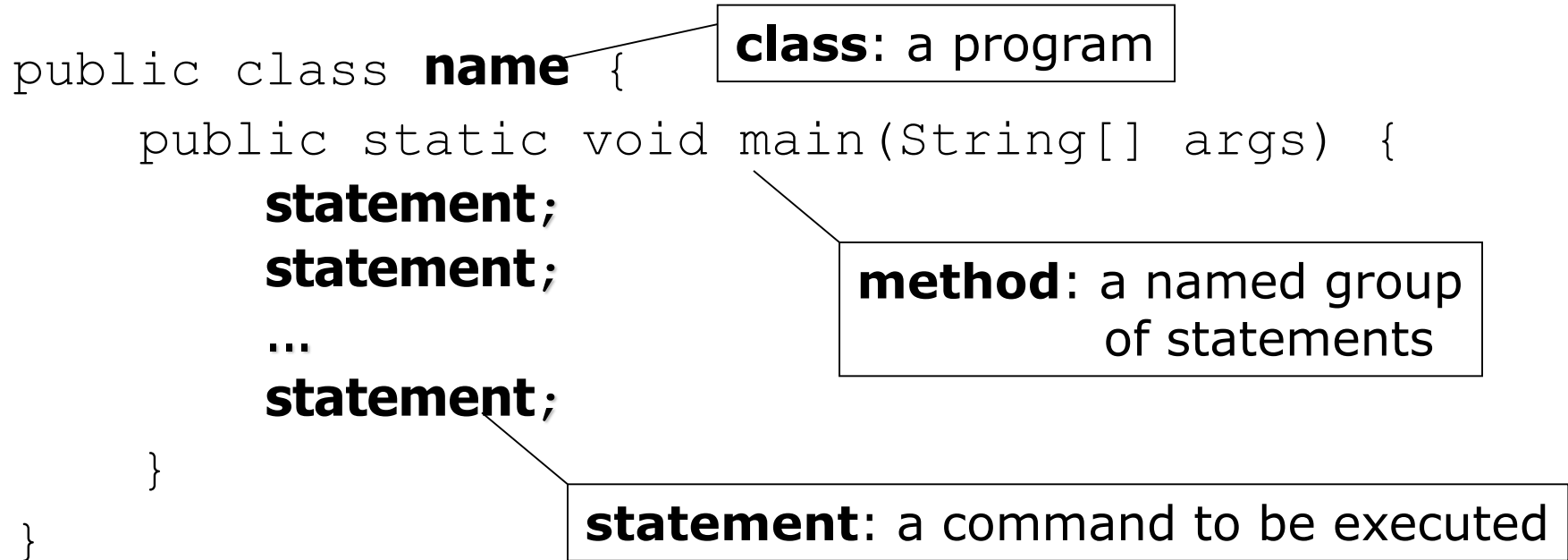
Hello, world!

This program produces  
four lines of output

- **console:** Text box into which the program's output is printed.



# Structure of a Java program



- Every executable Java program consists of a **class**,
  - that contains a **method** named `main`,
    - that contains the **statements** (commands) to be executed.

# System.out.println

- A statement that prints a line of output on the console.
  - pronounced "print-linn"
  - sometimes called a "println statement" for short
- Two ways to use `System.out.println` :
  - `System.out.println("text") ;`  
Prints the given message as output.
  - `System.out.println() ;`  
Prints a blank line of output.

# Names and identifiers

- You must give your program a name.

```
public class GangstaRap {
```

- Naming convention: capitalize each word (e.g. `MyClassName`)
- Your program's file must match exactly (`GangstaRap.java`)
  - includes capitalization (Java is "case-sensitive")

- **identifier**: A name given to an item in your program.

- must start with a letter or `_` or `$`
- subsequent characters can be any of those or a number

• **legal:**    `_myName`        `TheCure`        `ANSWER_IS_42`        `$bling$`

• **illegal:** `me+u`            `49ers`            `side-swipe`        `Ph.D's`



# Keywords

- **keyword:** An identifier that you cannot use because it already has a reserved meaning in Java.

abstract	default	if	private	this
boolean	do	implements	protected	throw
break	double	import	<b>public</b>	throws
byte	else	instanceof	return	transient
case	extends	int	short	try
catch	final	interface	<b>static</b>	<b>void</b>
char	finally	long	strictfp	volatile
<b>class</b>	float	native	super	while
const	for	new	switch	
continue	goto	package	synchronized	

# Syntax

- **syntax:** The set of legal structures and commands that can be used in a particular language.
  - Every basic Java statement ends with a semicolon ;
  - The contents of a class or method occur between { and }
- **syntax error (compiler error):** A problem in the structure of a program that causes the compiler to fail.
  - Missing semicolon
  - Too many or too few { } braces
  - Illegal identifier for class name
  - Class and file names do not match
  - ...

# Syntax error example

```
1 public class Hello {  
2     pooblic static void main(String[] args) {  
3         System.owt.println("Hello, world!")_  
4     }  
5 }
```

- Compiler output:

```
Hello.java:2: <identifier> expected  
    pooblic static void main(String[] args) {  
        ^
```

```
Hello.java:3: ';' expected  
    }  
    ^
```

```
2 errors
```

- The compiler shows the line number where it found the error.
- The error messages can be tough to understand!